

Manchester State Forest
Forest Certification Management Plan
South Carolina Forestry Commission
Working Document
July 2020

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1. Forest Management Planning

A. Forest Management Plan

Manchester State Forest (MSF), located in Sumter and Clarendon Counties, consists of approximately 28,675 acres of mixed pine and hardwood species native to the midlands of South Carolina. Soil types consist of 48% Sand and 39% Complex. See Figure 1 for soils map. MSF is being managed to be a healthy, productive, forested ecosystem, while improving the quality of life in South Carolina through the environmental, educational, economic, and recreational benefits of active forest management.

MSF's objectives are to generate revenue in order to sustain personnel and operations, protect the resources from natural and human factors that cause unwanted damages, promote forest health through maintaining biological sustainability and diversity, and enhance the overall experience of the citizens of South Carolina. MSF's objectives are in line with the agency's mission to protect, promote and enhance the forest lands of South Carolina in a manner consistent with achieving the greatest good for its citizens.

MSF practices principles of high quality multiple-use and sustained-yield forest management. Multiple use management includes enhancing timber production, fish and wildlife habitat, air and water quality, soil conservation, scenic beauty, scientific research, and recreational opportunities. It does not mean that all uses must coexist at the same time. Depending on the circumstances on different parts of the forest, one use might be dominant while other uses are subordinated. Sustained yield means assuring that the renewable resources of the forest will always be available without impairing the productivity of the land.

The state forest system is mandated to be self-supporting, MSF generates revenue through timber sales, pine straw sales, recreational permit fees, and land leases. A unique situation for our state forests is a law requiring that we give 25% of our gross income to the school district in which the revenue was generated. Therefore, within the scope of our management approach, and our attempt to provide the people of South Carolina with the greatest and best use of the forest, we do so with the over-arching requirement that significant timber and pine straw harvesting will be required.

MSF encompasses over 26,000 acres of productive forest land. The majority of the land base is dominated by 64% of pine, with hardwoods comprising 29% of the forest and unstocked areas and cultivated fields making up the remaining 8%. MSF has three dominant pine types Longleaf pine comprising 10,000 acres, followed by Loblolly Pine at just under 7,000 acres, and Slash pine at 577 acres. Swamp bottomland hardwood is the dominant hardwood type, with 6,675 productive acres located almost exclusively in the Wateree River floodplain.

MSF is divided into 4 discontinuous compartments (Figure 2). Within these compartments, stands are delineated at an appropriate scale for management application (Figures 3-10). Data for these stands is maintained in a GIS database, which contains all relevant stand level data and all other environmental databases that includes information on roads, soils, hydrology, threatened and endangered species, invasive species, elevation, and other data as needed. Data is obtained from many different state and federal agencies, or developed in-house where applicable.

MSF began utilizing a harvest scheduling model for timber management in 2007. Designed under contract by Forsight Resources, development of the model and required updated inventory began in 2004, with initial implementation beginning in Fiscal Year 2008. In 2014, Manchester State Forest switched contractors and started using ForesTech International to improve inventory and harvest schedule modeling. ForesTech receives inventory data collected by MSF staff, runs growth and yield analysis using SiMS_2009 products, and produces an allowable harvest schedule based on several assumptions and constraints developed by MSF. These constraints consists of cash flow, harvest size, adjacency harvest, and harvest triggers based on basal area and age (Figure 11). While areas for harvesting are recommended through spatial modeling, on-the-ground implementation of that harvesting, as well as other management operations determine action.

Our current inventory program uses point sampling methods to collect tree heights, diameters, and defects to focuses more directly on areas that were recently harvested and planned harvest scheduled three years out. We are sampling 1 point for every 4 acres. This inventory method allows us to account for changes in growth due to productivity increases and decreases. This will allow for us to input updated inventory data into our harvest model runs, thus allowing for better growth and yield values.

Figure 12, shows that our allowable harvest are not exceeding our overall growth. Figure 13, shows that our actual harvested tons are not exceeding our allowable harvest tons. These allowable harvest values are calculated when stands are scheduled to be harvest and checked against inventory data to make sure sustainability is continual.

In order to keep up with all the different management practices, we have a number of in house documentation forms used to tract management activities. These forms are updated when needed and stored on the agency employee website under State Forest.

Figure 1. Manchester State Forest Soils Map

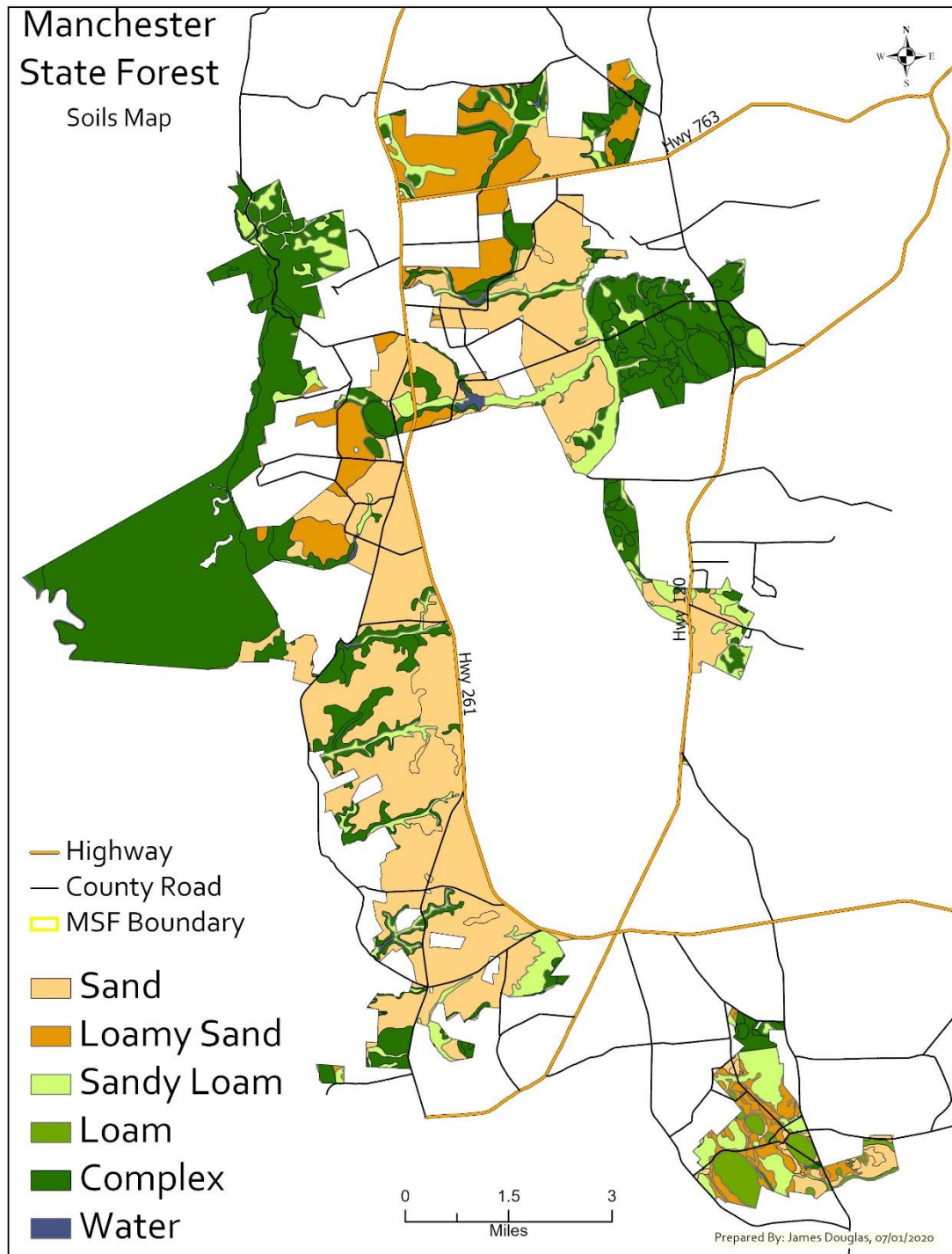


Figure 2. Manchester State Forest, Compartment Delineations.

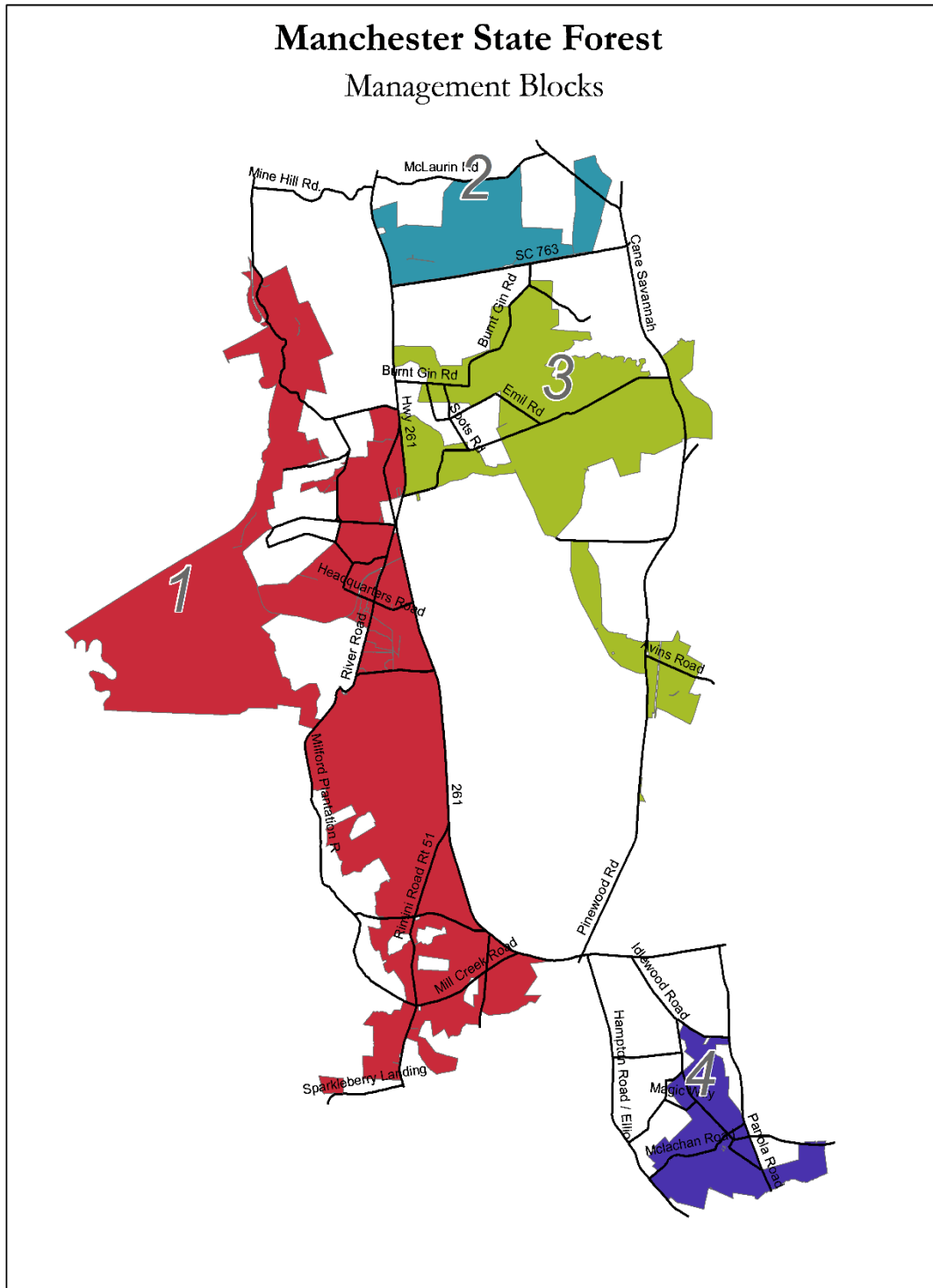


Figure 3. Manchester State Forest, Compartment 1 North stand delineations.

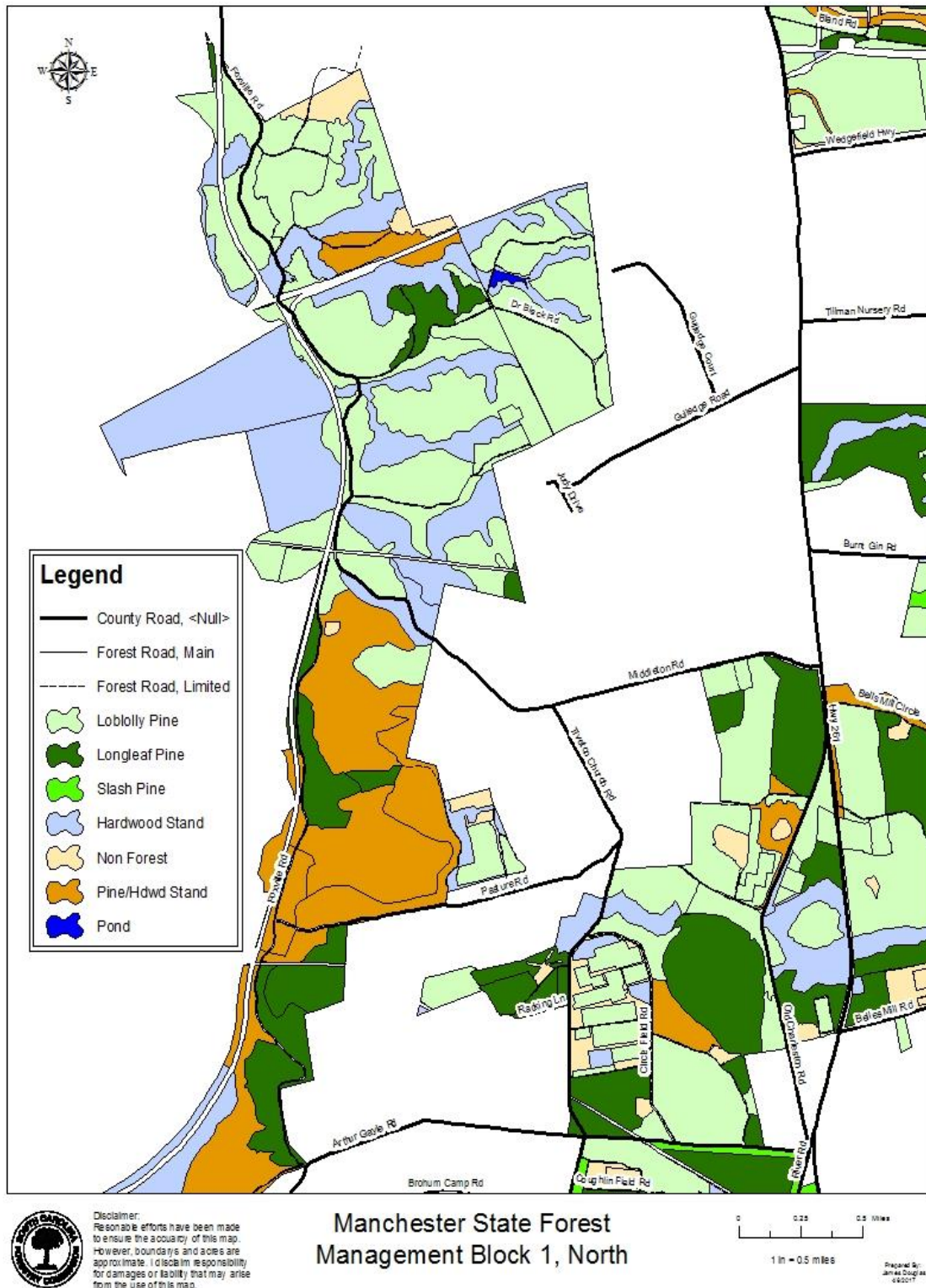
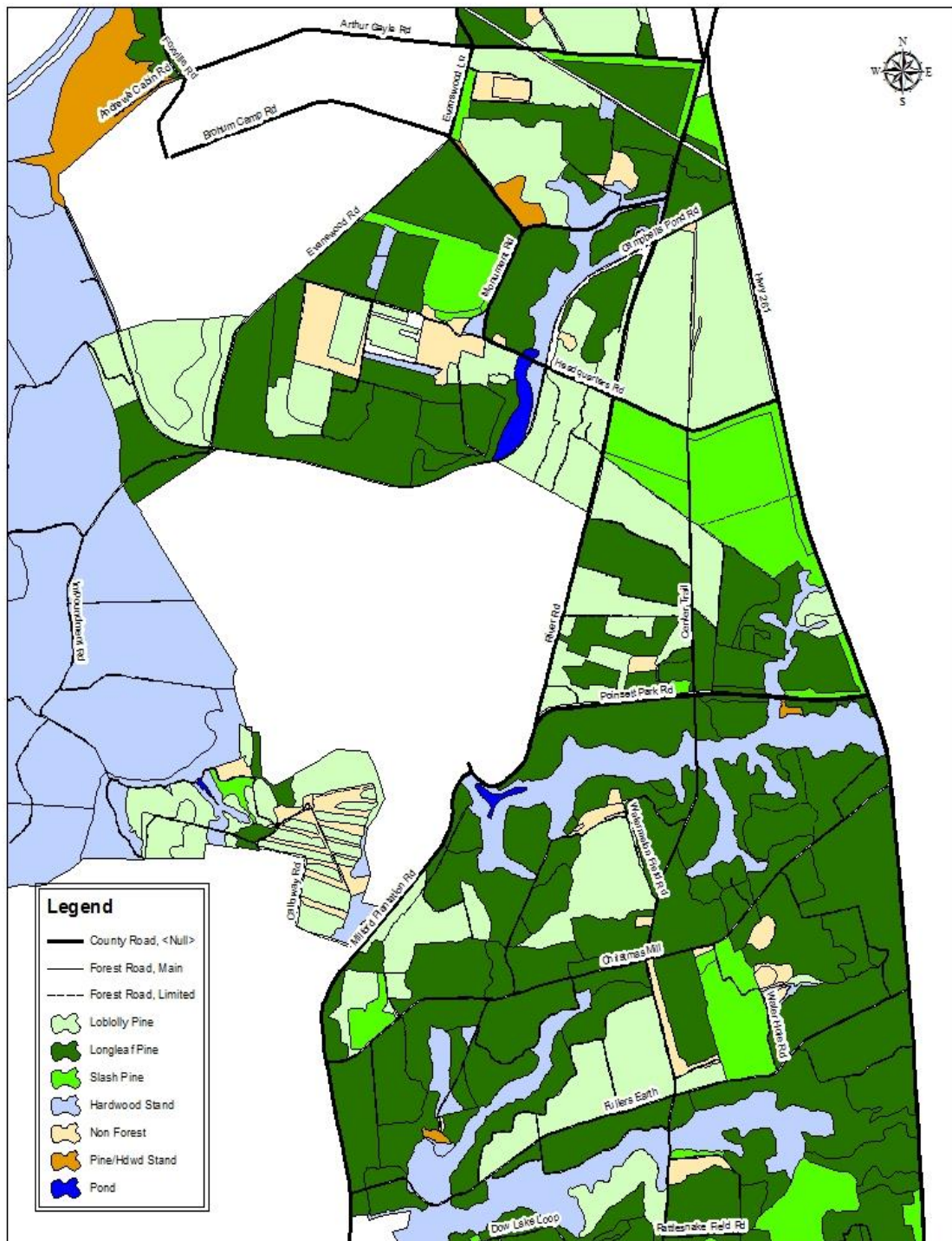


Figure 4. Manchester State Forest, Compartment 1 East stand delineations.



Disclaimer:
Reasonable efforts have been made
to ensure the accuracy of this map.
However, boundaries and acres are
approximate. I disclaim responsibility
for damages or liability that may arise
from the use of this map.

Manchester State Forest Management Block 1, East

0 0.25 0.5 miles
1 in = 0.5 miles

Prepared by:
James Douglas
4/20/17

Figure 5. Manchester State Forest, Compartment 1 West stand delineations.

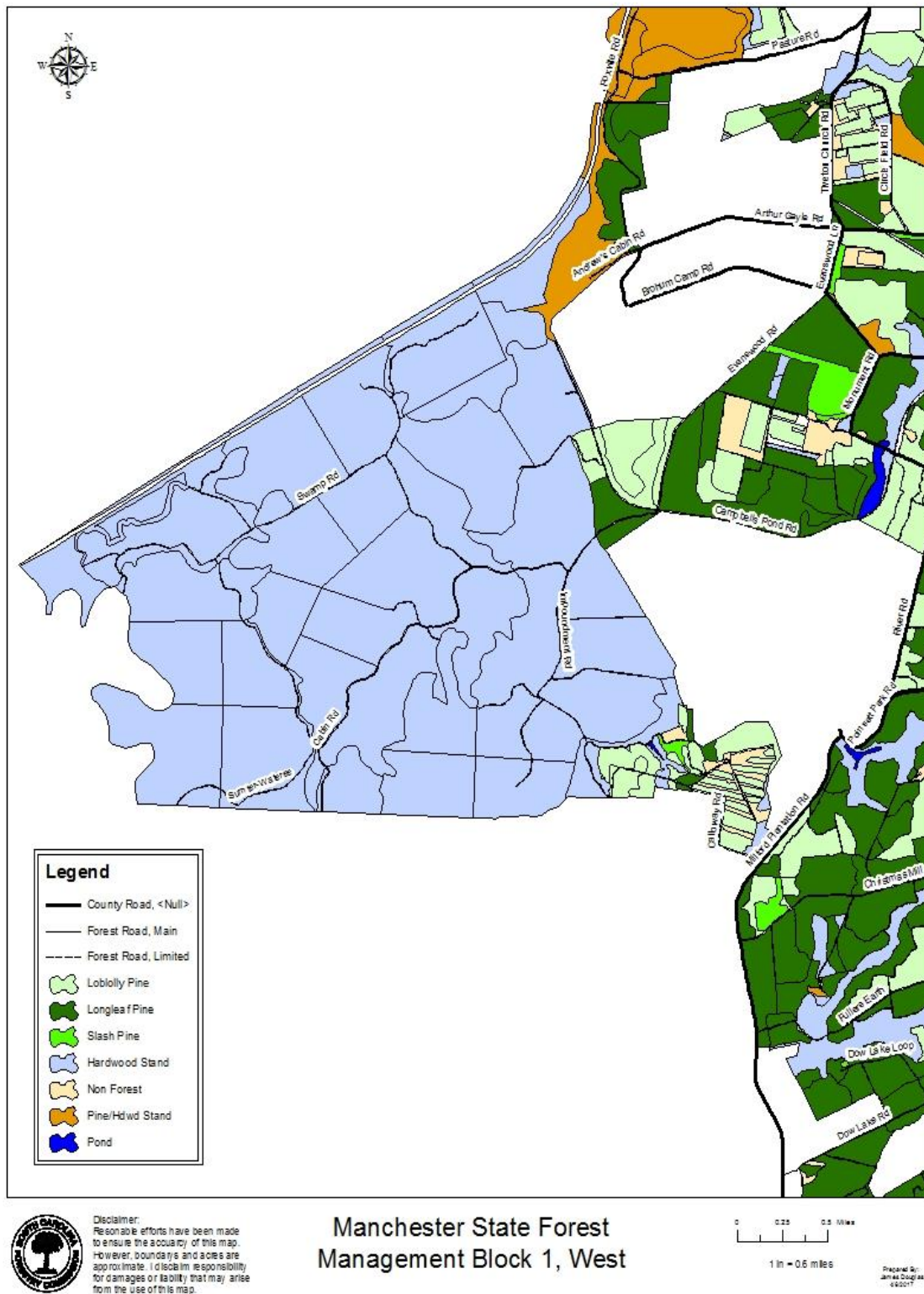


Figure 6. Manchester State Forest, Compartment 1 South stand delineations.

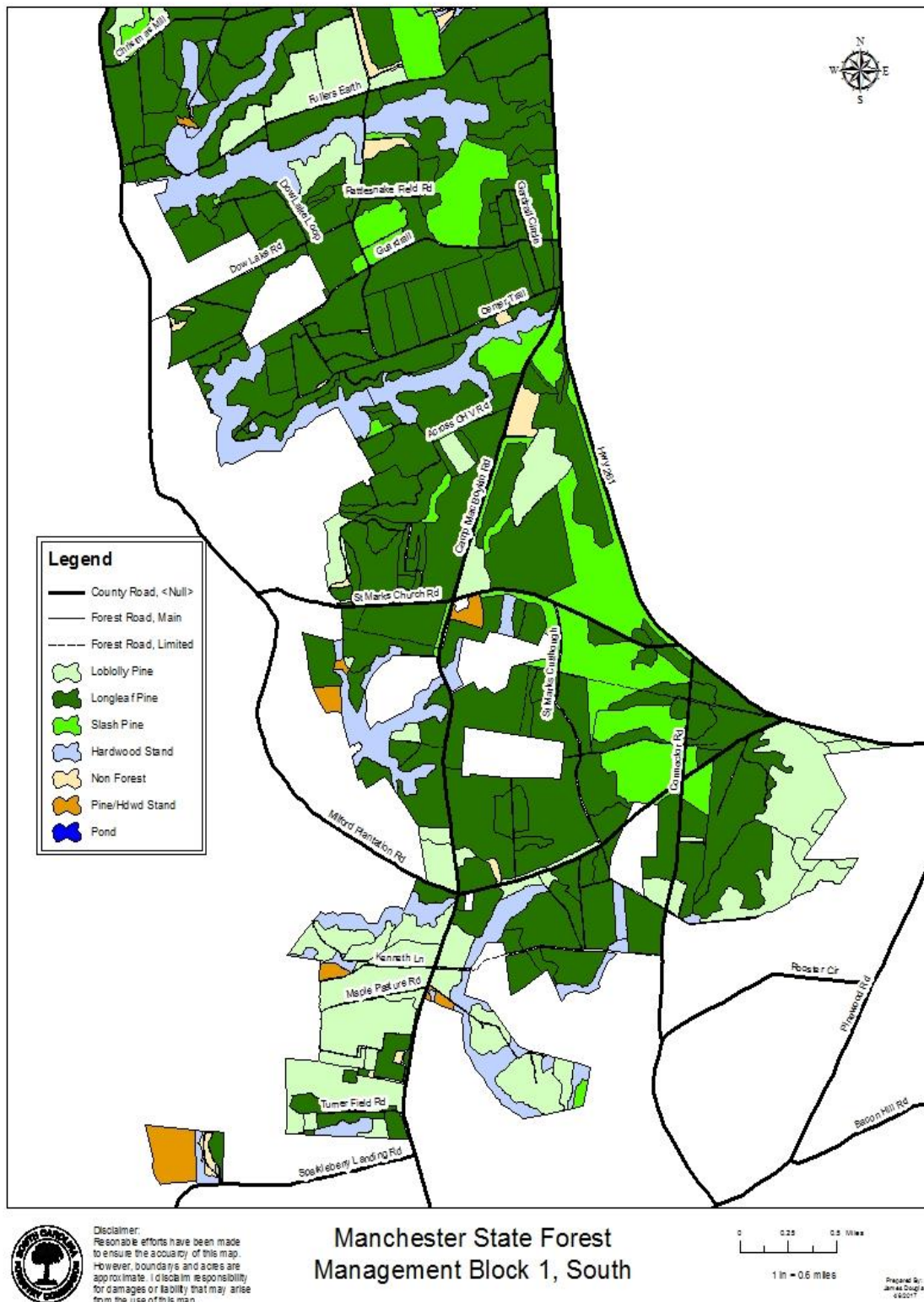


Figure 7. Manchester State Forest, Compartment 2 stand delineations.

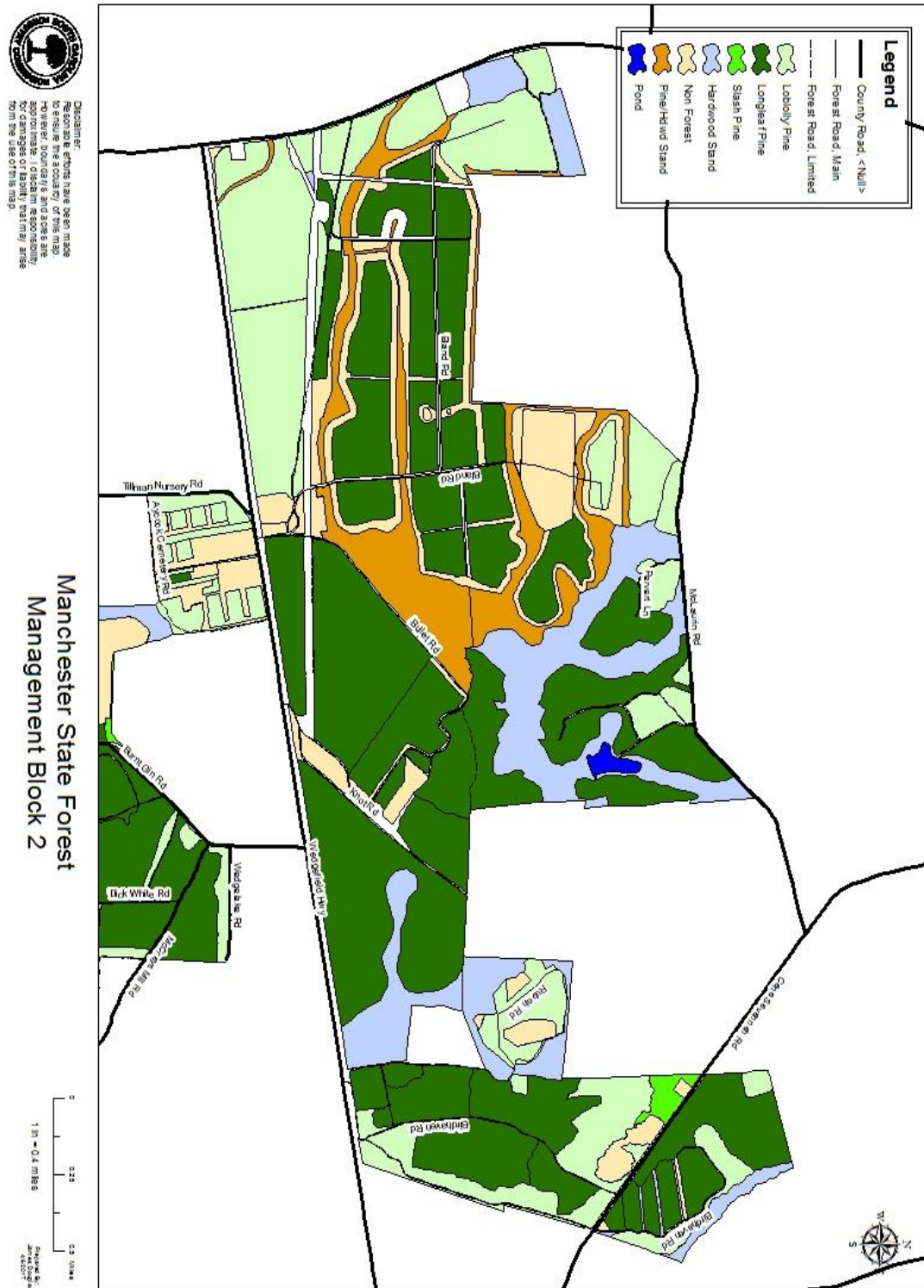


Figure 8. Manchester State Forest, Compartment 3 North stand delineations.

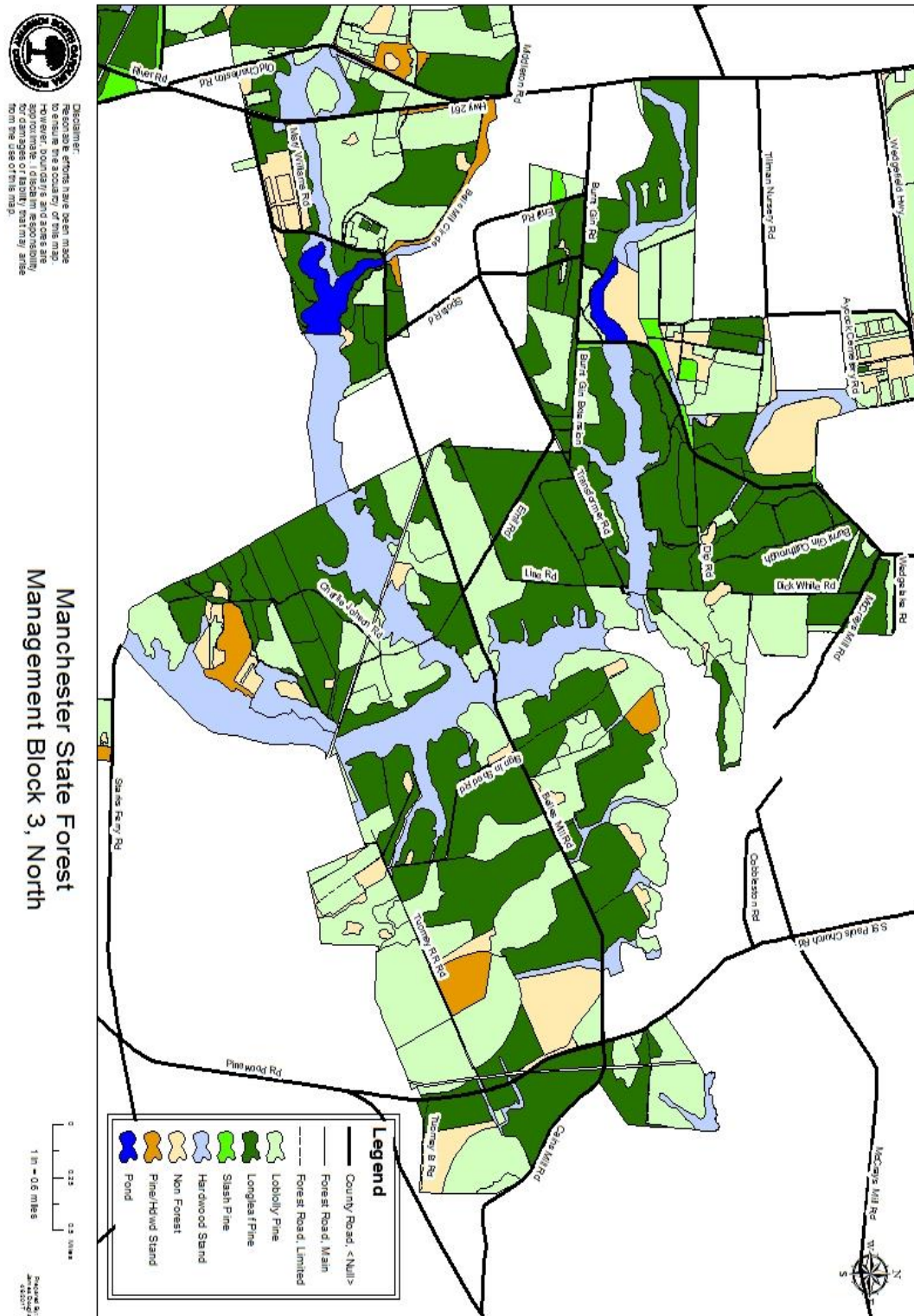
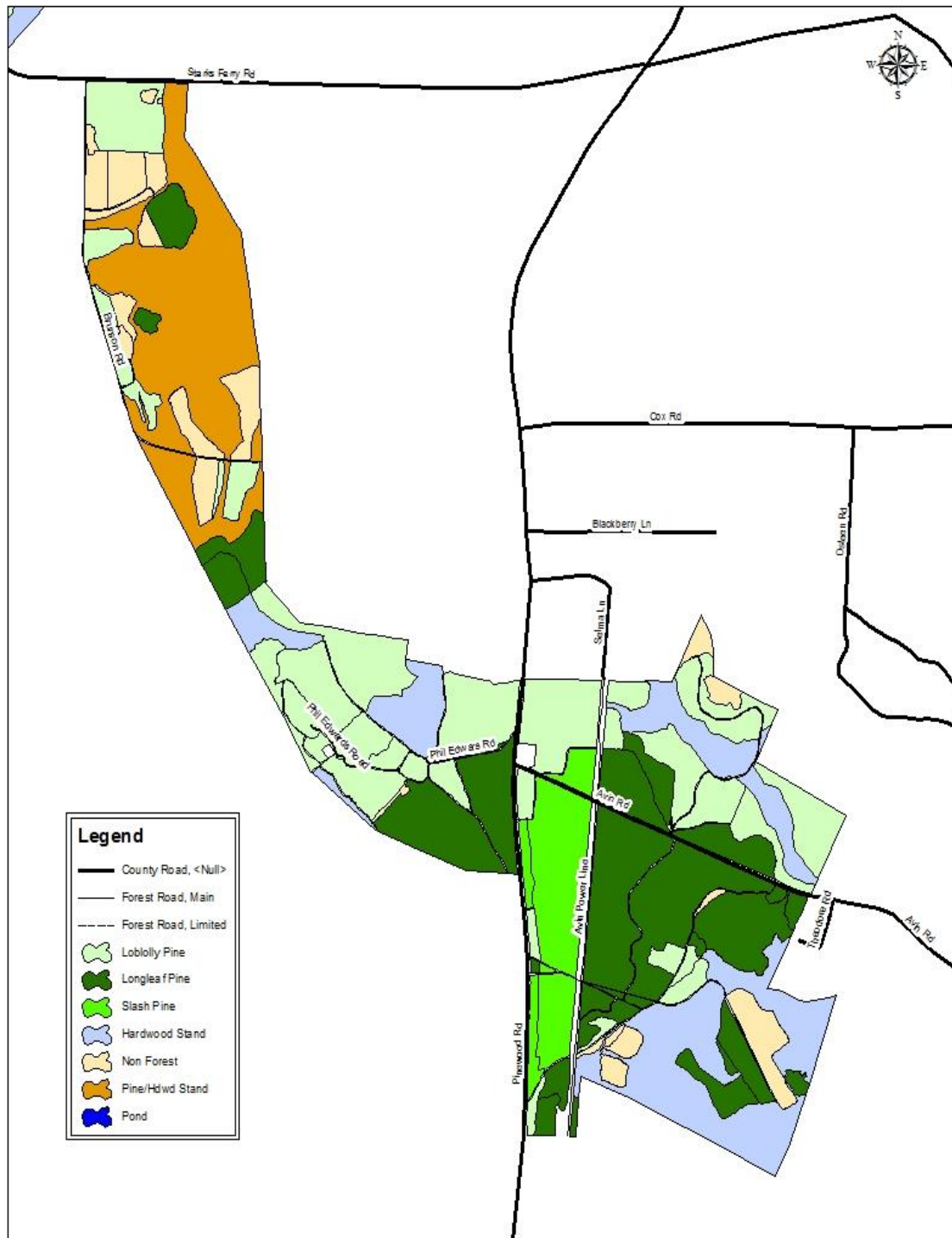


Figure 9. Manchester State Forest, Compartment 3 South stand delineations.



Disclaimer:
Reasonable efforts have been made
to ensure the accuracy of this map.
However, boundaries and acres are
approximate. I disclaim responsibility
for damages or liability that may arise
from the use of this map.

Manchester State Forest Management Block 3, South

0 0.25 0.5 Miles
1 in = 0.3 miles

Prepared By:
James Douglas
4/20/07

Figure 10. Manchester State Forest, Compartment 4 stand delineations.

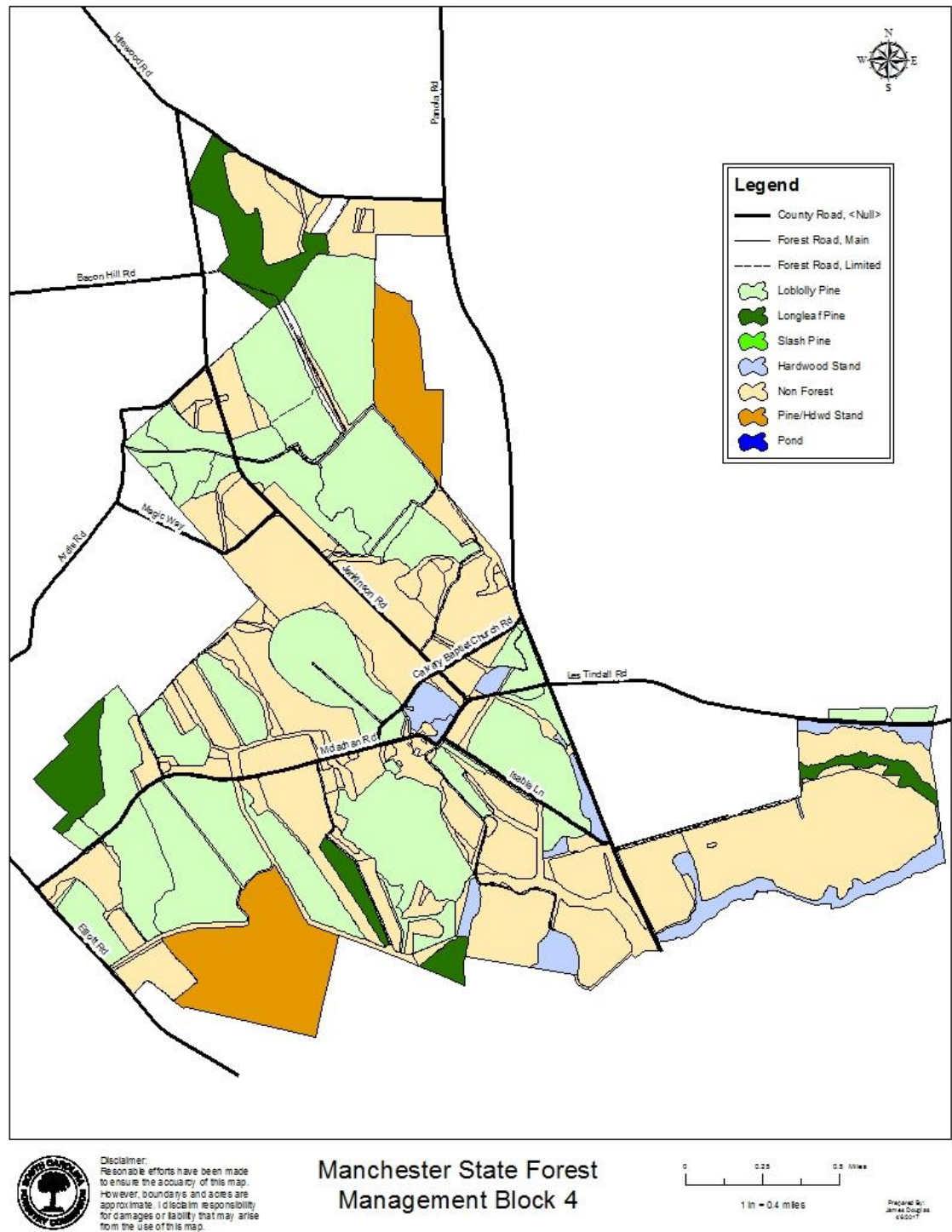


Figure 11. Harvest Schedule Assumptions and Constraint

Loblolly Pine

1st Thin

- Minimum harvest tons/acre: 25
- BA thinning target: 110 ft²/acre
- BA residual post-harvest: 70-80 ft²/acre
- Products: All products available if specifications are met

2nd Thin

- Minimum harvest tons/acre: 25
- BA thinning target: 90 ft²/acre
- BA residual post-harvest: 60 ft²/acre
- Products: All products available if specifications are met

Other Thins

- Minimum harvest tons/acre: 20
- BA residual post-harvest: 70 ft²/acre
- Products: All products available if specifications are met

Final Harvest

- Minimum harvest tons/acre: 25
- Minimum Age: 40 years
- Maximum Age: 60 years
- Max Size: 100 acres
- Products: All products available if specifications are met

Longleaf/Slash Pine

1st Thin

- Minimum harvest tons/acre: 25
- BA thinning target: 110 ft²/acre
- BA residual post-harvest: 80 ft²/acre
- Products: All products available if specifications are met

2nd Thin

- Minimum harvest tons/acre: 25
- BA thinning target: 90 ft²/acre
- BA residual post-harvest: 60 ft²/acre
- Products: All products available if specifications are met

Other Thins

- Minimum harvest tons/acre: 25
- BA thinning target: 90 ft²/acre
- BA residual post-harvest: 60 ft²/acre
- Products: All products available if specifications are met

Final Harvest

- Minimum harvest tons/acre: 25
- Minimum Age: 60 years
- Maximum Age: 80 years
- Max Size: 100 acres
- Products: All products available if specifications are met

Bottomland Hardwood

- Minimum Age: 80 years
- Maximum Age: 100 years
- Max Size: 100 acres
- Products: All products available if specifications are met

Figure 12. Manchester State Forest Growth Compared to Allowable Harvest Per Year.

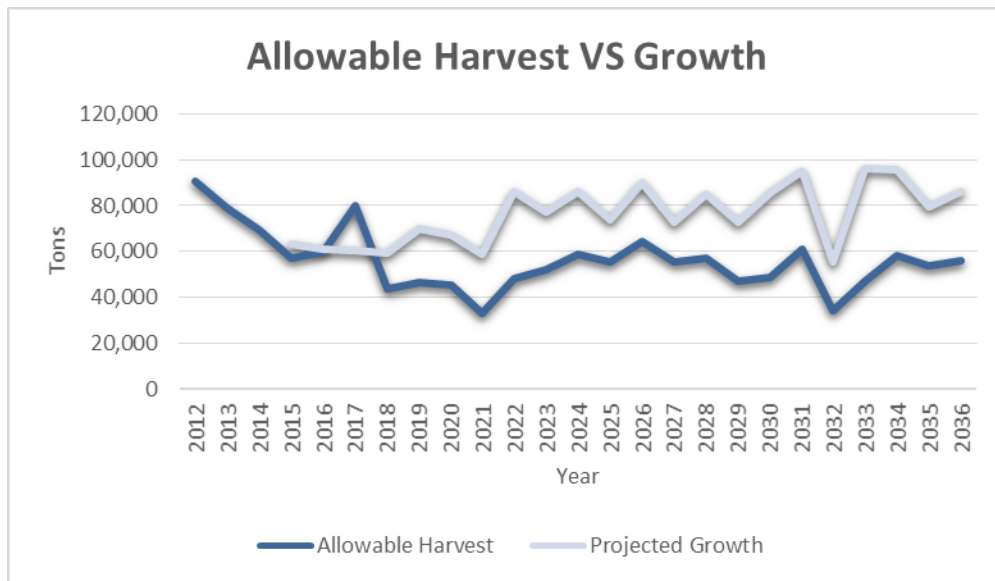
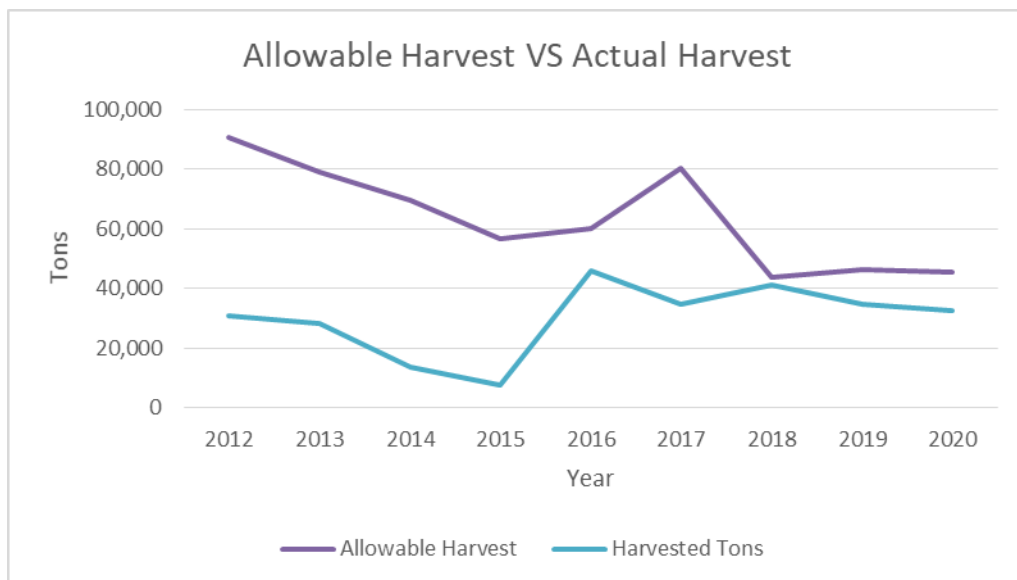


Figure 13. Manchester State Forest Allowable Harvest Compared to Actual Harvested Per Year.



B. Conversion of Forest Cover Type

MSF only converts one forest cover type to another if the land is better suited for a different cover type. For the most part, whatever is in place currently is what the stand will be replaced with. Some exceptions include stands previously planted in pine will be evaluated using soil maps and historical range maps to determine the correct species of pine to be planted.

C. Conversion to Non-Forestland Use

MSF has no intentions of converting forestland to non-forestland outside of the occasional establishment of wildlife food plots, forest access roads, recreational trails, etc.

2. Forest Health and Productivity

A. Reforestation

Artificial and natural regeneration schemes are dependent on current stand cover type and desired future cover type. The following provides a general overview of how we approach these stands, however some deviation may be expected on an individual basis.

In much of our pine forest, where we are either replacing a stand with the same species or replacing to a different pine species, our plan includes artificial planting. In our hardwood forests, we typically allow for natural regeneration following a rotational harvest. In mixed pine/hardwood stands with a significant pine component or site conditions favorable for pine, we may use artificial regeneration to plant the stand to a more desirable composition of pine.

Planting is conducted generally in the late fall through early winter, in year one or two after final harvest. Planting is conducted by contract using trained tree planters, through a bid proposal program as required by SC state law. Monitoring of the planting operation is conducted to ensure proper spacing and planting depth are maintained, as outline in clear language in the planting contract.

To determine adequate stocking after planting, we sample 0.5% of each stand through seedling survival checks in early spring, one-year following planting. If survival is below 40% or stand condition is poor, we replant the entire stand or do an addition survival check the next year. If survival is below 60% or stand condition is poor or moderate/poor, we replant entire stand if mortality is equally distributed or in plant if mortality is localized or consider chemical release or consider prescribe burn for release or do an addition survival check the next year. If survival is below 90% or stand condition is moderate/poor to moderate, we would consider in planting if mortality is localized or chemical release or prescribe burn for release. If survival is above 90% or stand condition is moderate to acceptable, we would consider chemical release or prescribe burn for release or

no action. In stands where natural regeneration is chosen, spot sampling is conducted within the first 5 years to determine stand composition and stocking.

Most of Manchester State Forest (MSF) is in acceptable forest cover, only a few areas of the forest are in consideration for afforestation work. Primarily, some of our retired wildlife food plots have been planted to full forest cover, and cover type selection is specific to that site and its associated conditions. In addition, a portion of the forest is currently under agricultural lease, and if and when that lease expires we may consider afforestation of that acreage.

B. Use of Chemicals

MSF primary use of chemicals consist of site preparation for pine planting, pine release after planting, understory control, and agriculture use. Almost all of the chemicals used in forested stands is done through contract labor, through a bid proposal program as required by SC state law. Agricultural use is limited to dove fields and wildlife food plots. Chemicals used and rates applied are chosen based on the least amount of chemical required to achieve management objectives and label intent and requirements.

MSF is aware of and does not use the chemicals listed under the World Health Organization (WHO) type 1A and type 1B, unless no other alternative is available, and the Stockholm Convention on Persistent Organic Pollutants. Reference material can be found on the agency employee website under State Forest.

We consider integrated pest management as part of our overall management of MSF, through promoting healthy and vigorous stands of timber. By conducting thinnings in timely manners, stands are reduced to include the strongest and healthiest trees to mature. Other factors involved are selecting appropriate species and seedling varieties depending on site specifications. We are continuously taking training to keep up with new and evolving pest. Our agency insect and disease personnel conduct pest trapping to determine possibilities of outbreaks. We use our inventory system to monitor stands for potential problems that may arise.

MSF currently has one person licensed as a pesticide applicator. This person keeps up with in-house use and contractor use of pesticides to insure proper use of pesticides.

C. Protection and Maintenance of Forest and Soil Productivity

MSF is mostly situated on soils of poor productivity, and indeed this characteristic partially is responsible for the state's acquiring of the property. We outline in all contracted harvesting operations that Best Management Practices (BMPs) be adhered to, skid rows and decks be minimized in size and impact to the site, and field personnel monitoring the harvest address any violations or areas of concerns as they occur. A performance bond is part of the contract to ensure all

post-harvest clean-up work is conducted. We also notify and request Agency BMP foresters to preform BMP courtesy exams on all harvesting operations.

In some portions of the forest, particularly our bottomland swamps, we work with timber contractors to allow for seasonal access to timber to mitigate any problems associated with regular and infrequent flooding. In some cases, we may provide for extensions to our harvest contracts in an effort to minimize this impact.

We require that the site be left to specific conditions that are beneficial to subsequent harvesting, but since we use hand crews to artificially plant, we allow for retention of large woody debris and tops. Site preparation may include prescribed fire application to minimize the obstruction this harvesting debris may pose.

D. Damaging Agents

We consider forest health as many-faceted. Impacts to forest health are many, and this section addresses first our approach to natural disasters and forest management, the subsequent risks from more common health issues, such as insect and disease outbreaks.

There are several natural disasters that may affect our State Forest lands, though primarily wildfires, flooding events and hurricanes/wind storms are considered the most likely. Indeed, the impacts of these types of events have been recurring and constitute a significant factor in how many of our management operations can take place.

Wildfire/Prescribe Fire

Fire is a natural part of the forest ecosystem across much of the state forest system. We maintain a program of prescribed fire management, both to enhance the condition of the forest stands while also serving to mitigate wildfire risk through forest fuels reduction. All fire line employees go through extensive, continually training to be allowed to participate in prescribe burning. Along with the training, annually we do fire line refreshers and moderate level pack testing to remain fire line certified. Forest personnel use prescribed fire in many instances: site preparation, fuels reductions, timber stand improvement, aesthetics, and improved habitat through species management. Our personnel are trained and licensed through the Agency, and we maintain a high level of fire preparedness. All burns are overseen by a certified prescribe fire manager and documentation such as burn plans and weather outputs are maintained.

However, periods of time exist where the risk of uncontrolled wildfire on State Lands is high. In such cases, the SC Forestry Commission, being recognized as the Agency with authority over containing and suppressing all wildfire on both State and private lands, is readily equipped to address fires on Manchester State Forest by trained personnel.

Flooding

With bottomland forest comprising several thousand acres of our Forestland, minor flooding is frequent and primarily impacts access to affected lands. On a less frequent return interval, large-scale flooding events have been known to inundate almost all of our bottomland hardwoods at MSF. Long duration flooding has been known to increase tree mortality in susceptible species, and thus we consider flooding as a primary driver of species composition in these riparian forests. Access during these events is extremely limited, and often considerable road improvements are required post-flooding. Timber harvest activities in our bottomland hardwood forests are generally limited to regeneration harvests potentially up to 100 acres in size. Adjacency restrictions are adhered to as described in our management section, and the stand is allowed to naturally regenerate. When needed, buffer strips are used to protect our riparian zone forest, and some thinning may be conducted in these stands as needed. Thinning is done in accordance to BMPs, and help to maintain a healthy forest while providing some addition revenue.

Hurricanes

While small-scale wind events occur fairly frequently across the forest, we consider the damages and management implications to be generally small and can be addressed on an individual basis. Large-scale wind events, primarily hurricanes, are an inevitability in the Southeastern Coastal United States.

Emergency harvesting activities are conducted as needed. We address this concern in two ways. From a management perspective, we have over time returned much of our forest to its natural stand composition of Longleaf Pine, the most resistant of the pine species to the impacts of hurricanes. Through thinning operations, we also maintain stands with adequate spacing which reduces wind throw susceptibility.

As a part of the states' Incident Management System, we have an enhanced ability to address the immediate effects of a hurricane event. Through training, maintenance, and readiness planning, we can open roads, provide access, and generally address user safety immediately after an incident.

Ice Storms

The risk of severe ice storms in the central region of South Carolina is slight, but does occur on an irregular cycle. Slash pine is a species known to be susceptible to ice damage, and further is outside its accepted natural range. Large areas of the Forest were planted in Slash Pine from the time of acquisition until the 1950s, when it was supplanted by Loblolly Pine. Currently, as we harvest these mature Slash Pines we are replacing them with the historically and ecologically more appropriate Longleaf Pine, which is much less susceptible to ice damage.

Insect and Disease Risks

We consider active forest management, and maintenance of stands in a healthy and vigorous growing condition, as the most important approach to reducing impacts from insects and disease. Additionally, regular prescribed fire is used to promote forest health. Our location in central South Carolina is also favorable for reduced planting risks from several species of insects. Still, we try to monitor our forest and address these risks on an as-needed basis.

Some monitoring of the state forest is conducted as part of State-wide initiatives, but we generally address areas of concern as they develop. Where possible, we minimize the impact or spread of the outbreak through harvesting, a successful and recommended approach to some insect control. All such activities are incorporated into the planned harvest activity, and subsequent runs of our harvest schedule model will account for the experienced changes to the stand condition and associated inventory levels.

Our most important data collected for forest health is our forest inventory data, used to determine the timing of harvest operations. This data focuses on standard metrics needed to develop growth and yield models, including trees per acre, basal area, species, individual trees measurements of diameter at breast height, stopper height (height to first defect), and total height. If no defect is found, we use total tree height to develop volume estimates.

Other types of assessments that may apply include regional studies conducted by our agency's Insect and Disease laboratory, which monitors for outbreaks and insect population measures, and general day-to-day assessments by on-site field personnel.

E. Improved Planting Stock

MSF utilizes improved planting stock of longleaf and loblolly pine. Genetically Improved seedlings are purchased from the Arbogen Taylor Nursery, which is in a contract with the SC Forestry Commission. In-house tree improvement staff are consulted to determine adequate genetic selection.

MSF allows portions of its property to be used for research for improved planting stock through progeny sites or other research needs. The SC Forestry Commission is a part of the South Eastern Tree Improvement Co-op, run by NC State.

3. Protection and Maintenance of Water Quality

A. Water Quality and State BMP's

The South Carolina Forestry Commission (SCFC) is the lead agency in South Carolina in designing, interpreting, monitoring, and updating forestry best management practices (BMPs) that protect water quality and conserve site

productivity. BMPs are science-based forest management practices, developed pursuant to federal water quality legislation, that minimize or prevent nonpoint source water pollution from forestry operations and give forest landowners and the forestry community guidelines to follow in practicing good stewardship on our valuable forestland. BMP implementation protects the quality of our drinking water and helps sustain the productivity of our forests for future use.

As part of the SCFC, the state forests lands, including Manchester State Forest (MSF), will serve as models for BMP implementation. They should meet or exceed all established BMPs, all applicable state water quality laws, and the requirements of the Clean Water Act for forestland. State forests will make all efforts necessary to ensure that there are no negative impacts to water quality or site productivity from forestry operations (i.e., forest road construction, timber harvesting, site preparation, reforestation, prescribed burning, pesticide application, fertilization, or minor drainage) on their lands.

In addition, All state forest employees involved in the supervision of forestry operations will be required to have appropriate BMP training (i.e. Timber Operations Professional or equivalent), and all contractors operating on state forests will be required to have appropriate BMP training (i.e. Timber Operations Professional or equivalent) and will be responsible for BMP compliance on their work site. State forests will include this requirement in all bid invitations and contracts.

B. Water quality and Riparian Protection Programs

As previously mentioned, our agency is the lead agency in BMP monitoring for the state, and as such we include guidelines for maintaining their use in our timber sale contracts. Site conditions over much of the forest reduce the need for extensive road and landing design, however in areas where the concern exists our staff works closely with harvest operators to best locate their decks and skid trails. Only our bottomland hardwood forest requires regular monitoring and access control, and we do so through regulation of forest gates that can prevent access during wet weather conditions.

Our GIS contains several hydrology layers, including streams and other water bodies, and these layers are used to identify areas of concern in stands before harvesting is conducted. Field foresters make on-the-ground assessments for BMP use, and design stand boundaries in accordance. In cases where there is concern with BMP adherence or rules, we use our agency personnel in charge of BMP monitoring to assist in making management decisions.

Our harvest contract requires compliance with BMP use, and also the inclusion of a performance bond to promote BMP use or pay for remediation work, as needed. We make agency personnel in charge of BMP monitoring aware of all harvest and request a courtesy BMP exam be done on all of our harvest contracts.

MSF address wet weather events through contracts and working relationships with loggers and other contractors to maintain water quality. All contractors are to adhere to BMP guidelines. The forest director or his representative have the right to stop any ongoing work that may cause a water quality issue. All logging operations are subject to a courtesy exam by a BMP forester with the SCFC. MSF can also withhold some or all of from a logger's performance bond. MSF foresters and technicians perform activity maintenance checks weekly on all forest management jobs.

4. Conservation of Biological Diversity

A. Biological Diversity

Having such a natural range of species composition across our forest, we find our current management approach, primarily emphasizing timber production, adequately provides for a range of species, habitats, and ecological communities. Manchester State Forest (MSF) is aware of South Carolina's Statewide Forest Resource Assessment and Strategy developed by the SC Forestry Commission (SCFC) and the SC Department of Natural Resources (SCDNR) State Wildlife Action Plan.

MSF contains a wide range of habitats including diversity within stands and across the landscape. This mix of forest types provides excellent habitat for many wildlife species, both game and non-game. Many forest management activities are beneficial to game species of wildlife. Practices such as thinning, prescribed burning, planting beneficial tree species, and supplemental wildlife food plots encourage a variety of game species. White-tailed deer, bobwhite quail, mourning dove, and eastern wild turkey are the most prevalent game species in our forests. Other species, including rabbit, gray squirrel, fox squirrel, and waterfowl are also present. The streams and ponds on state forests contain excellent fishing opportunities.

MSF is enrolled in the SCDNR's Wildlife Management Area (WMA) program, which allows public hunting opportunities. Through this cooperative agreement, SCDNR monitors the health of game species and provides recommendations and funding to maintain and increase populations. Forest management activities should be planned to maximize the benefits to game species by considering appropriate timing of an activity, size of the affected area, and spatial arrangement.

Non-game wildlife species play an important role in management planning and prescriptions on state forests. Threatened and endangered wildlife species and species of concern, including the red-cockaded woodpecker, Pine Barrens tree frog, green salamander, and neo-tropical migratory birds are considered when forest management activities take place. Endangered species populations are managed with input from SCDNR and the US Fish & Wildlife Service (USFWS),

utilizing appropriate habitat management measures to increase and maintain populations. Where sensitive species are known to occur, particular concern should be given to reducing fragmentation of habitat, maintaining and creating additional high-quality habitat, and complying with the Endangered Species Act.

As part of the WMA program, key assessments of wildlife are taken by the SCDNR, although forest staff frequently assist in population monitoring for the SCDNR upon request. Subsequent hunting regulations, dates and times, and seasonal availability are determined in cooperation with SCDNR to maintain a healthy forest wildlife community.

B. Threatened and Endangered Species, Forests with Exceptional Conservation Value, Forest of Recognized Importance, and Old-growth

MSF currently has 5 clusters of Red Cockaded Woodpeckers (RCW) located on the far south end of Compartment 1. The RCW is considered endangered at the federal and state level, with a G3 and a S2 ranking. We utilized the adjacent Poinsett Weapons Range, which is a RCW recovery site, RCW biologist to monitor our populations and staff from Sand Hills State Forest to help with monitoring of populations. MSF is not a recovery site. During nesting season, April 1st to July 1st, we do not allow any forest product harvesting in these areas. The five RCW partitions on MSF are managed according to Private Lands Guidelines specified in the Recovery Plan, which call for a minimum of 75 acres of foraging habitat within ¼ mile of the RCW cluster center. Since these ¼ mile circles overlap on MSF, the resulting RCW partitions are all smaller than the prescribed 125 acres, with one having a total area of only 38 acres. Clearly it is impossible to provide 75 acres of non-overlapping foraging habitat in all the partitions. Instead, it was decided to prorate the 75 acre threshold on each partition, requiring 60% of the area to be qualified foraging habitat in all periods.

As we implement our harvest schedule model and develop site-specific plans for product removal, particularly adjacent to areas of concern, we inspect for presence of species and make changes to our long-term plans accordingly. Additionally, we request in our harvest contract that operators also notify us if any species of concern that are located. According to Heritage Preserve data, only 2 G2 species were recognized near MSF. These 2 points are not within MSF's boundaries and last known observations were in 1975 and 1985. We keep up with ever changing data through Heritage Preserve. MSF is not aware of any G1 or G2 species that currently exists within our boundaries, therefore we are not considered a forest with exceptional conservation values (FECV).

As a representative of unique values associated with exceptional ecological, social, cultural and biological conservation, Manchester considers itself to be a forest of recognized importance (FORI). At the landscape level, MSF is one of the larger landowners in the area and one of a small few that are open to daily public activities. MSF consists of 4,000 acres of bottomland hardwood adjacent to the

Wateree River, 5 clusters of RCW, several cemeteries, at least one Native American midden, historical buildings, etc. MSF is also adjacent to an air to ground weapons range managed by the US Military called the Poinsett Weapons Range. The Oak Lea tract of Manchester is a Focal Area in the SC Bobwhite Quail Initiative.

Our active forest management does not identify old growth conservation as a primary objective. However, in areas of limited access, within riparian areas, swamps, and other sites, we may allow for old growth conditions to remain or develop. As a self-supporting division within our agency, we often are not able to increase the rotation age of stands to that which resembles old growth conditions due to revenue needs.

C. Management of Invasive Species

MSF handles invasive species on an as needed basis. Invasive species are documented, monitored, and controlled, if deemed necessary. Some of the known species that exists on MSF are kudzu, bradford pear, Japanese climbing fern, wisteria, lespedeza, wild hogs, etc.

The state forest system has a form used for documentation of invasive species located on its website. Our website also contains reference material on our website from the NatureServe, Millers's 2006 Nonnative Invasive Plants of Southern Forests, Hamrick et al. 2011 Wild Hog Management Guide provided by the Mississippi State University Extension Service, and the SCDNR coyote control.

D. Ecologically Important Sites

The SCDNR is our primary contact and advisor for management of critical species and habitats on the forest. We also are aware of the State Historic Preservation Office (SHPO). The University of South Carolina (UofSC) has been utilized in the past for expertise on certain areas found to have importance. Data related to these critical sites is maintained in GIS system, and is available by request-only, so as to discourage site degradation from public access.

E. Manage Wildlife Habitat and Contribute to Diversity

Within stand management we allow for increased biological diversity through many factors. Retention of snags, allowance of coarse woody debris, and the robustness of our BMP riparian zone interpretation all increase the variability of habitat and diversity within stands. Our adjacency constraints on harvesting and are limits of harvest size (green-up constraints based on age and tree height, and rotational harvest limited to 100 acres maximum size), also provide for a shifting mosaic of stand conditions at the tract level.

5. Management of Visual Quality and Recreational Benefits

A. Impact of Harvesting on Visual Quality

Our visual constraints in harvesting are many. We limit harvest size, and manage for timing of harvest activity, to prevent large non-forested openings. We may leave aesthetic buffers along trail systems, or in areas heavily frequented by recreational users. However, in all of these areas we violate our constraints during harvesting operations where we are converting from an undesirable species to a more desirable species. Primarily, this occurs in stands of Slash Pine being replaced by Longleaf Pine, and we have observed that in areas where aesthetic buffers are left, we often have difficulties later with seeding in of residual Slash Pine from the buffers. These decisions are made on a stand by stand basis.

We do not have an active management program in our road design, and frequently we work with our timber contractors and operators to allow them to install decks and skid rows where best meets their needs. Due to the remoteness of most of our forest lands, we do not generally consider the location of the deck a critical aesthetic concern, however we do work closely to minimize the size of the deck, any debris piles that may be left behind, and ensure that no litter or waste associated with the contractor are left on site. Enforcement of these rules is in compliance with the performance bond inclusion on the timber contract.

B. Rotational Harvest

Manchester State Forest limits rotational harvest to 100 acres in total size. This constraint is taken into account through our harvest modeling schedule. By limiting all rotational harvest to 100 acres or less in size, our average rotational harvest size will not exceed the SFI standard of 120 acre average.

C. Green-up Requirement

Manchester State Forest requires a green-up of 5 feet tall or 3 years, before an adjacent stand can be rotationally harvested. This constraint is taken into account through our harvest modeling schedule.

D. Recreation

The goal of the South Carolina Forestry Commission is to provide outdoor recreational opportunities on the state forests that are compatible with forest management activities. The SCFC will strive to accommodate the needs of the various recreational user groups that enjoy the state forests. However, as is the case for forest management activities, management of recreational activities will not take precedence over the protection and enhancement of the environment. In addition, management for the sustainability of forest products will always take priority over recreation and other forest management activities.

There are a variety of recreational opportunities in South Carolina's state forests. In fact, the opportunities are as diverse as the forests themselves. There are equestrian, mountain biking, hiking and OHV (off highway vehicle) trails, and a rifle and pistol range. Other activities include picnicking, bird watching, and canoeing to name a few. Manchester State Forest has historically been enrolled in the Wildlife Management Area (WMA) program, which is regulated by the Department of Natural Resources. Therefore, hunting and fishing on this State Forest require applicable licenses and a WMA permit and is allowed only in designated areas during the appropriate seasons. For more detailed information on hunting and fishing activities, refer to the annual DNR Hunting and Fishing Regulations.

It is through sound multiple-use forest management that the SCFC plans to maintain the integrity of and enhance the state forest environment while providing for future natural resource uses, including recreation.

6. Protection of Special Sites

A. Special Sites

The South Carolina Forestry Commission (SCFC) is aware of many special sites existing across our state forest lands system, and continues to maintain, preserve, and enhance these sites on an individual basis. Our regulations for all state forest lands clearly forbids metal detecting, collection of artifacts of any kind, digging on or damaging forest lands, or collection of any vegetative material without the express consent of the agency.

The location of some of these sites, specifically existing structures and cemeteries, are made available to the public with varying levels of access. However, many of the historical sites are considered sensitive, and information regarding their location is kept within the agency and made available on an individual basis.

Manchester State Forest (MSF) maintains a GIS layer that includes special sites that exist on the forest. As sites are discovered, they are added to the GIS layer. This GIS data is only maintained in-house.

Examples of special sites include but are not limited to historic home sites, cemeteries, unique landforms, rare plant locations, archeological sites, unique habitats, and other historically significant sites.

7. Efficient Use of Forest Resources

A. Forest Harvesting Technology, In-woods manufacturing Process, Practices to Minimize Waste, and Efficient Utilization of Harvested Trees

Manchester State Forest adheres to many principles of sustainable forestry and best use of forest products. All harvests conducted must be done in strict accordance with BMP guidelines, and we monitor harvesting operations to ensure compliance.

Certain considerations are taken into account when developing how our harvest operations will take place, which is applicable across all stands. In cases of low quality timber, or stands with poor species composition, we try to employ employee improvement cuts, where possible. These harvests aim to remove undesirable stems and improve the existing stand or the condition of the stand for the development of the next stand, if a seed-tree cut is employed. In stands where timber is of low-quality and not desirable for harvest, we require all timber to be cut to a minimum DBH of 5 inches, and left on the ground to better prepare the site for planting. Since harvest values are ultimately derived through an open-bid process as required by law, we have limited ability to force the buyer to utilize some of the lesser quality timber on-site. Instead, we hope that through the bid process our winning bid estimated profit margins based on the greatest utilization of the timber present.

We inspect post-harvest areas to ensure that site conditions outlined in each harvest contract are met. This includes the treatment of slash and debris, reductions in piles, and that all stems above given diameter are removed. This ensure the site is better prepared for harvesting, burning, and/or receptive to seed dispersal from leave trees.

The South Carolina Forestry Commission (SCFC) and state forest lands base our volume estimates on common diameter and height specifications. However, we do not translate these measurements into required log utilization specifications. Traditionally, we have allowed the harvest contractor to determine the optimal specifications for merchandizing. Similarly, as our timber harvesting is done under contract, we have not tried to impose restrictions on how that timber is merchandized, or developed any incentives for the better utilization of off-grade wood.

Harvest operation sites are only monitored in relation to conditions as outlined in each harvest contract, which includes site conditions post-harvest, relative to slash, debris, and related factors. Our performance bond, included in each contract is used to ensure these conditions are met. However, since product utilization has

not become a component of our stumpage marketing, we do not have any current assessments in place for that over site.

The state forest is a voting member of the South Carolina Sustainable Forestry Initiative state implementation committee. This committee is charged with maintaining, overseeing, and improving the SFI program through various programs including logger training, teacher tours, children programs, landowner meetings.

8. Recognize and Respect Indigenous Peoples' Rights

A. Recognize and Respect Indigenous Peoples' Rights

Currently no state or federally indigenous peoples have claims relating to South Carolina Forestry Commission (SCFC) state forest lands. As inventories and management activities are conducted should possible sites be discovered state forest manager and state lands coordinator are to be made aware. State Historic Preservation Office (SHPO), State Commission of Minority affairs, and state archeologist will be consulted.

B. Confer with Affected Indigenous Peoples

SCFC state forest manager and state lands coordinator shall confer with affected indigenous people with respect to sustainable forest management practices.

State forest manager and state lands coordinator shall confer with affected indigenous people seeking to:

- a. understand and respect traditional forest-related knowledge;
- b. identify and protect spiritually, historically, or culturally important sites;
- c. address the use of non-timber forest products of value to Indigenous Peoples
- d. respond to Indigenous Peoples' inquiries and concerns received.

C. Respond to local Indigenous Peoples on Private Lands

Manchester State Forest (MSF) will respond to inquiries and concerns of Indigenous People on Private lands as requested.

9. Legal and Regulatory Compliance

A. Forestry Related Social and Environmental Laws and Regulations

The South Carolina Forestry Commission (SCFC) and Manchester State Forest (MSF) in particular is committed to complying with all social laws, including but not limited to those covering civil rights, equal employment opportunities, anti-discrimination and anti-harassment measures, workers' compensation, indigenous

peoples' rights, communities' right to know, prevailing wages, workers' right to organize and occupational health and safety.

Forest personnel conduct post-harvest inspection, as well as site monitoring during harvesting as feasible, and address any issues as they arise. Site inspection includes Best Management Practice (BMP) considerations as well as general site conditions following operator egress. In addition, we maintain an open line of communication with our contractors to allow them the opportunity to contact us as they encounter situations that may conflict with BMP guidelines, their contractual obligations, or other issues. Further opportunity is provided during post-harvest evaluation and any required mitigation work, which is terminated with the release of the aforementioned performance bond.

Our agency personnel are made aware of all social laws, and rights of workers at time of hiring. In addition, our agency has a defined grievance policy for redress of conflicts as they may arise. All information required relevant to worker's rights is posted in a public area.

For our contractors, we include language in our contracts that requires the following is ensured for their employees:

- Workers compensation is provided to all employees
- Workers are provided with liability insurance
- Contractor will only employ legally allowed workers
- Contractor will abide by all federal, state, and local laws

B. Take Appropriate Steps to Comply with Laws and Regulations

Several components are involved to ensure staff and contractors have access to relevant laws and regulations. Our forest personnel are provided with training in BMPs, and work closely with contractors through evaluation of contract obligations. Our contractors themselves are required to be Timber Operations Professional (TOP) Logger certified in the case of timber operations, and a trained tree planter when hired for planting operations. Adherence to BMPs and other provisions is required within the contract, with performance bond limits to ensure operators remain within those limitations. BMP guidelines and other relevant information is available through many venues, including headquarters of the forest operations. MSF is aware of and supports the rights of workers and labor representatives outlined through the International Labor Organization (ILO). The ILO aims to promote rights at work, encourage decent employment opportunities, enhance social protection and strengthen dialogue on work-related issues for all people.

The state forest system employs a lawyer to look over contracts and any special issues that may arise, as needed.

10. Forestry Research, Science and Technology

A. Forest Research

As part of the South Carolina Forestry Commission (SCFC) we are associated with many research opportunities, with the forest providing sites, data, and manpower when requested. Manchester State Forest (MSF) uses a special use permitting system to keep track of requested use of lands for research.

The agency has an insects and disease lab, which monitors for different activities across the state, as well as frequently on the state forest. This data is used both in-house and cooperatively with other state and federal agencies. The work conducted by this lab helps to identify threats and concerns associated with insect and disease outbreaks, and better prepares us to address these events as they occur. The agency maintains its own tree improvement operations. Through association with our nurseries, we provide areas for research plantings, actively use nursery stock within our own operations, and serve as a benchmark for tree improvement performance over time. MSF allows the nursery to use land for research such as orchards, progeny sites, and test plantings.

In some cases, our collective state forest system have provided land and data as outside support for other research requests, including chemical applications, tree improvement studies, biomass plantations and more.

Our agency also serves as the liaison for the conductance of Forest Inventory and Analysis (FIA) for the state of South Carolina. Our agency employees conduct all plot sampling, with coordinated reporting of results which is used both internally and by the United States Forest Service (USFS).

B. State, Provincial or Regional Analyses

Through our association with the South Carolina Department of Natural Resources (SCDNR), and through our direct participation of most of our state forests as a Wildlife Management Area (WMA), much of the work performed on biological diversity and wildlife management has fallen under their purview. We work together to collect data on population surveys.

We consider our role more associated with providing access and land for research plots where possible as our method of supporting forest research, rather than through direct financial contributions.

Our agency has also been the state compliance monitor for Best Management Practices (BMPS), and have generated annual reports of compliance for many years, and multi-year analysis of compliance in white papers and peer-reviewed journal publications.

The SCFC and state forest personnel, served as lead reporters and committee researchers in a comprehensive analysis of the state, finalized in the South Carolina State Forest Resource Assessment (Forest Action Plan).

The SCFC and the state forest system are a voting member of the SFI State Implementation Committee (SIC). Through this membership we have the power to vote on issues that will impact sustainability of forest and forest products in SC.

The SCFC is the lead instructor for the wood magic forest fair, the South Carolina teacher's tour, project learning tree, etc. We are also highly involved in the implementation of the Top Logger program and monitor logging operations through state BMPs.

C. Awareness of climate change impacts

MSF is aware of climate change and its potential effects to future ecosystems, both forest and wildlife. Our foresters keep up to date with climate change through continued education and training. The SCFC Forest Action Plan address current status and evolving trends dealing with climate change. The SCFC Forest Action Plan also address the role of the trees and forest play in moderating the effects of climate change.

11. Training and Education

A. Appropriate Training of Personnel and Contractors

The South Carolina Forestry Commission (SCFC) and Manchester State Forest (MSF) are devoted to communicating our commitment to the SFI 2015-2019 Forest Management Standards through an open letter from our state forester and through a letter sent to all our contractors of our involvement with the SFI standards. These letters can be found on our website.

A training matrix has been developed and utilized to determine the training and amount of training required for each of the different roles of employees on the state forest.

Contractors are required to have sufficient training in there related field of professionalism. Examples included loggers must be TOP Logger certified, foresters must be state registered, tree planters must be trained through the SCFC, pesticide applicators must be licensed, etc.

B. Foster Improvement in the Professionalism of Wood Producers

Through our participation in the South Carolina Implementation Committee and the Forestry Association of South Carolina, we get the opportunity to work with cooperatives to create specialized training to improve forest operations. Some of

the trainings include state best management practices (BMPs), Top Logger certifications, educational programs, etc.

12. Community Involvement in the Practice of Sustainable Forestry

A. Landowner Cooperative Programs

The agency, and forest personnel, provide support, mostly in the terms of time, for the following SIC programs.

- Project Learning Tree
- Wood Magic Forest Fair
- Teachers Tour

These different programs require different assistance. In previous years, the state forest system at large has served as the location and facility support for all of these events. Personnel have provided event support, and will continue do to so. Lastly, some personnel work with these programs as part of their day to day functions, providing, at least indirectly, some financial support in terms of staffing.

The development and distribution of educational material to forest landowners has, in years past, fallen under the supervision and direction of other entities within the agency. Still we provide educational materials on site at each state forest, and also participate in a leadership role in landowner and educational tours on our lands.

Manchester State Forest (MSF) works closely and open with different user groups of the forest and community based groups. Recreational user groups included Sumter Enduro Riders Motorcycle Association (SERMA), the Manchester Trail Riders (MTR) (local horse club), Palmetto Trails organization, the SC Litter Association, local forestry chapters, etc.

From an agency perspective, conservation of managed forests has been addressed through cost-share programs. Under our state forest system specifically, we have provided facilities and program support, although generally on an as-needed basis.

Much of MSF has been acquired using different conservation programs. The original portion of MSF was acquired through the Bankhead-Jones Farm Tenant Act 1937. Other conservation programs that MSF has utilized in obtaining land are Forest Legacy Program, South Carolina Conservation bank, and US Army (National Guard Bureau).

B. Public Outreach and Education

Our outreach participation, as previously described elsewhere, is through leadership and participation in the Wood Magic Forest Fair, Teacher's Tour, and Project Learning Tree programs.

Our public educational opportunities are many. Across the state forest system, we participate in Future Farmers of America (FFA) events, conduct field tours, provided training and educational opportunities to local schools, provide volunteer opportunities to various groups, and have developed or are in the process of developing self-guided tours, respectively. In addition, personnel frequently provide their services, through speaking engagements and teaching opportunities, to many schools, groups, conferences, and other users on an annual or by request basis.

C. Stakeholder Concerns

There are many avenues through which public inquiries can be made and subsequent response actions taken. The agency, and forests alike, use interpersonal communications, social media, regular postal and email, and other avenues as they arise to take concerns and inquiries for our actions. These inquiries are then directed to the appropriate parties, researched, and then responded to in a timely fashion.

The agency and state forest system will address stakeholder concerns regarding apparent nonconforming practices on an individual basis.

13. Public Land Management Responsibilities

A. Public Land Planning and Management Processes

The state forest system is involved in land management planning in many venues. Following these guidelines, we continue to update and adapt a management plan specific for each state forest, which more closely addresses their respective objectives and relative concerns. Finally, and in concert with our management plans, a harvest schedule model has been developed, which supplies additional data for our forest system to better meet its needs.

Contact with local stakeholders over forest management issues is provided through many relationships, associations, and previously mentioned venues, as described elsewhere. Various trail groups, riding associations, and other organizations have, over time, developed lines of communication with our forest personnel, from interpersonal to regular meetings, where concerns over respected issues can be brought forward, or addressed collectively. However, the state forest position has, to this point, been to address concerns or requests on an as-needed basis, rather than seek out the inputs of any given group.

We address issues or events as if and when they arise, making appropriate contact with tribal leaders when necessary, and taken any corrective actions, as deemed appropriate.

14. Communications and Public Reporting

A. Summary Audit Report

Upon completion of our management plans tailored to the most current standard, we shall submit our documents to the certification body for auditing. These documents will be assessed for content, and congruence to the SFI Standards, and the results will be submitted to SFI Inc. for posting to an external website. We shall also maintain all records of our audits for certification or recertification on hand at our forestry commission headquarters in Columbia, SC, as well as each respective state forest. We shall also work towards developing a documentation library, to better facilitate the auditing process.

B. Annual Progress Reports

The state lands coordinator is responsible for SFI Standard adherence, and for collating data and preparing and submitting annual progress reports to SFI Inc. Reporting will be conducted in congruence with the SFI program.

15. Management Review and Continual Improvement

A. Review System

The agency and state forests in particular will use the following categories and associated criteria in the evaluation of the effectiveness of SFI programs and achieving continuous improvement in performance:

- a.** Improved effectiveness of management process
 - i. Operational improvements
 - ii. Streamlined management
 - iii. Improved review process to meet standard
- b.** Realized increases in SFI certified wood and wood products
 - i. Enhanced revenue stream
 - ii. Increased participation of contractors
- c.** Improved recognition of our leadership or exemplary status in sustainable forest management
 - i. Increased request for SFI literature or information
 - ii. Increased appearance of agency in relevant publications and literature
 - iii. Increased request for our participation in events or literature related to forest sustainability